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PROFILING HEAD ACCELERATIONS USING TRIAXIAL ACCELEROMETERY DURING 'BODIES IN FRONT' TRAINING PLAY: A PRELIMINARY STUDY OF THE SPORT OF RUGBY LEAGUE

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Objective; To provide unique descriptive information on head accelerations, both linear and rotational, during 'bodies in front' training play.

Design A convenience sample were tested using a cross-sectional design. Players wore a triaxial accelerometer (XPatch, X2 Biosystems, Seattle) during two sessions of training gameplay (session duration 142±26 min). Accelerometers were affixed on the left side of the head, at a point approximate to the external occipital protuberance. Setting Testing was undertaken at an elite performance training centre.

Participants 20 elite, professional, rugby league players.

Main outcome measures; Minimum recordable accelerations were set at 10 g (linear acceleration) and 25 rads s-2 (rotational acceleration).

Results; A total of 1256 recorded 'hits' were analysed, excluding evident artefacts. No player was reported to have suffered a concussion. Player 'loading' was 46±33 hits per session (range 7– 170). Average linear (14.9±8.8 g) and rotational (532±347 rads s -2) accelerations were not significantly different between training sessions (P>0.05). Frequency of hits are summarised in the table below

Linear acceleration (g)	Cumulative%	Rotational acceleration (rads s^{-2})	Cumulative%
10–20	92.6	25–500	64.7
21–40	5.4	501–1000	27.5
41–60	0.7	1001–2000	5.4
61–80	0.5	2001–3000	1.6
81–100	0.4	3001–4000	0.8
>101	0.4	>4001	0

Conclusions; The majority of head accelerations occurred within lower 'sub-concussive' zones. This confirms existing research findings from other sports. Whilst few accelerations occurred in higher zones, there were a number of very high loading impacts observed in 'hit up forward' positions. Our research confirms the suitability of using portable accelerometers in determining head accelerations in full-contact, 'armourless', invasion games. Competing interests None.